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Implementation of environmental management systems standards: important factors in corporate decision-making

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Abstract

While Environmental Management Systems Standards (EMSS) have been advocated by policy makers and consultants on the basis of a number of benefits associated with their implementation some companies are reluctant to implement them. This paper tests four hypotheses with regard to the significance of a number of factors in a company's decision to implement EMSS. Specifically, it assesses whether a company would be more likely to implement EMSS if its management has a positive perception of environmental issues; if there are pressures on the company to improve its environmental performance; if opportunities arise through its environmental activities; and if it operates in sensitive environmental conditions. For this purpose, Greek companies in the process of EMSS implementation were surveyed and their responses compared with companies that had not decided up to that point to implement the standards. Specific aspects of the hypotheses posed were supported and confirmed a range of factors that are important in a company's decision to implement EMSS.

Key words: ISO 14001, EMAS, Greek industry, decision-making.

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Introduction

An increasing number of companies are implementing EMAS and ISO14001 while a variety of benefits have reportedly been associated with their implementation (Goodchild, 1998; Evangelinos and Blaza, 1999). However, while there is a number of companies successfully implementing the standards the overall uptake of the standards as a percentage of companies in the whole of industry is below 1%. (European Foundation, 2001). Also, it is widely acknowledged (e.g. Arora and Cason, 1996; Rivera-Camino, 2001; Steger, 2000) that little has been done to investigate the factors that may affect the decision to implement Environmental Management Systems Standards (EMSS)¹. Arora and Cason (1996) note that economists have mostly focused on the costs of environmental regulation ignoring the benefits that companies can get from improving their environmental performance. They suggest that several stakeholders such as consumers, NGOs, employees and the media increasingly put pressure on companies to be more environmentally aware. Rivera-Camino (2001) notes that very little has been written about the variables associated with the implementation of EMSS. He also suggests that unlike the US, which has produced most of the literature on EMSS, Europe is lacking in scientific information.

Therefore, there is a lack of understanding of the factors affecting companies in their decision to undertake voluntarily action with regards to environmental issues generally and specifically to implementing EMSS. However, if policy makers are to influence companies to adopt a voluntary stance towards environmental issues they require a clear understanding of the various factors that may affect a company's decision to implement EMSS.

¹ For the rest of this paper the term EMSS is used to refer to both ISO14001 and EMAS.

The purpose of this study is to assess whether a number of factors are important in a company's decision to implement EMSS. Specifically, it tests the relationship between the adoption of a voluntary initiative such as EMSS implementation and the following factors:

- a) Management perception of environmental issues.
- b) The pressure on a company to improve its environmental performance defined as the pressures from final and intermediate customers, local communities, legislation, non-governmental organisations (NGOs) and the general public.
- c) The potential opportunities of a company's activities with regards to environmental issues, such as energy and raw material efficiency, waste minimisation, increased management efficiency, better company image and relations with local communities, competitive advantage, easier access to financial markets, lower insurance premiums, better legal compliance and environmental protection.
- d) The potential influence of sensitive environmental surroundings in which the company operates.

Data collected from two groups of Greek companies: those currently implementing EMSS, and those that are not implementing the standards.

Next, an overview of EMSS is provided and the discussion supporting each of the hypotheses is presented. The design of the empirical study is justified, followed by a discussion of the results and some concluding remarks.

EMSS and important factors for their implementation

Environmental Management Systems (EMS) have been implemented by various companies over the last decades with the aim to deal in a systematic way with

the ever increasing importance of a number of environmental issues. EMS can help an organisation to control the impact of its activities, products and services on the environment by offering a structured approach to dealing with environmental issues.

During the 1990s efforts were made in order to formalise and standardise the procedures prescribing an Environmental Management System which resulted in Eco-Management and Auditing Scheme (EMAS) promoted by EU and the ISO 14001 promoted by the International Standardisation Organisation.

EMSS certification ensures that a company has in place the systems and procedures that are described by each Standard. They are not themselves a guarantee of an actual environmental improvement (Klaver and Jonker, 1998). For an effective implementation of EMSS a company should develop capabilities and support mechanisms to achieve its environmental policy objectives and targets (Sayre, 1996). Also a meaningful implementation of the standards requires commitment from the top level of management to improve environmental performance.

The provisions of EMAS helps the company to (Schaltegger and Burrit, 2000; Schaltegger *et al* 1996):

1. Formulate an environmental policy.
2. Conduct an environmental review.
3. Introduce an environmental programme and an environmental management system.
4. Conduct periodical environmental audits.
5. Produce an environmental statement.

The requirement of EMAS for an externally verified statement that has to be made available to the public is the main difference between EMAS and ISO 14001.

The effect of EMSS implementation can be variable depending on the company that adopts them. For example the implementation of EMSS in a heavy polluting industry requires considerable effort and resources and is followed by significant impacts on several sectors of the organisation. On the other hand, less or non-polluting sectors have to devote fewer resources and face fewer, if any, implications from EMSS implementation. Thus, there are a number of factors that directly or indirectly influence the intensity (and the perception) of costs and benefits of EMSS implementation; such factors can be crucial for the decision to adopt these management tools. These may be related to company characteristics such as the size of the organisation, the industrial sector in which it operates, its experience on other management systems and the management perception of environmental issues or may be related to factors external to the company such as the pressures the company experience from various stakeholders to improve its environmental performance and the opportunities that a company faces from its activities related to environmental issues.

Below, key issues from the literature review are identified, leading to the proposition of a number of hypotheses on the importance of a number of factors in companies' decision to adopt EMSS. Generally though, management perception on environmental issues has been the focal point in a number of different studies (e.g. Lindell and Kargozoglu, 2001; Goodchild, 1998; Steger, 2000). The pressure from a number of stakeholders/ issues and primarily from legislation on companies to improve their environmental performance has been documented as an important factor in companies' decision to undertake environmental measures (Business in the Environment, 1998). Also, opportunities from increased efficiency of internal operations as well as better relations with stakeholders have motivated companies to

be proactive on environmental issues (Diller, 1997; Grimshaw *et al*, 1998) The local environmental conditions within which companies' operate have not been examined before but the following analysis suggests that it could potentially play an important role.

The examination of the above-mentioned factors specifically in the context of EMSS aims to highlight the important factors in the decision to implement the standards. This in turn would provide policy makers with useful insights on the 'pressure points' that should be influenced in order to increase the uptake of the standards. This would be particularly important for Greek environmental policy, described as normative, rigid and legalistic as well as for the awareness of stakeholders which while increasing, is still at a low level (Getimis and Giannakourou, 2001).

The approach to this research is also innovative in that it compares companies that have implemented EMSS with those that have not. Steger (2000) stresses that only very few studies have looked at companies that lack EMS altogether.

Management Perception

There are indications that positive management perception of environmental issues could be of great importance in the decision to pursue EMSS implementation. A number of reasons could deter a manager from implementing EMSS. Firstly, the voluntary character of the initiative combined with possible relations of mistrust with regulators and administrators in the past (due to a long history of command and control regulation) could cause reluctance to adopt any of the schemes. Similarly, a proactive approach in dealing with environmental issues such as EMSS

implementation would not be encouraged if management treated environmental considerations as a threat rather than an opportunity.

The cost of implementation, particularly when it is excessive (or is perceived as such), is certainly an important factor for every manager to consider². In this case a profit maximising organisation is not likely to implement a voluntary scheme unless the government or other agencies support it financially. Alternatively, the benefits can outweigh the costs but sometimes their significance may be overlooked. Specifically, while most costs are payable immediately, most benefits would not be realised until a certain period after the implementation (Steger, 2000). Furthermore, since some of these benefits are of a preventative nature and intangible, they may be underestimated. This is due to the fact that companies' accountancy systems do not make provision for the inclusion of these preventative benefits and thus they cannot be entered on the books and be offset against some of the costs of EMSS implementation³.

Additionally, managers may fail to appreciate the full extent of the effects following EMSS implementation. Goodchild (1998) found that the perceived benefits that had driven companies to certification and those actually experienced during the first year of implementation were different. This gap between the expectations and the results could cause frustration for those companies currently implementing the standards and seeing their expectations unfulfilled, while also making other companies reluctant to proceed.

All the issues presented above could deter managers from implementing a standard that could otherwise be beneficial both for their company and the environment. However, a positive perception of management towards environmental

² In many instances EMSS can be more costly than the potential benefits.

³ Here benefits include a reduced risk both for liabilities and to the environment, organisational benefits, better employee morale and benefits to innovation.

issues could overcome these problems and facilitate a decision to voluntarily deal with environmental issues.

In conclusion, the first hypothesis to be tested (H1) is that the management of companies implementing the standards have a more positive perception towards environmental issues, than companies not implementing the standards.

Pressure on companies

Companies are under increasing pressure by various stakeholders in order to improve their environmental performance. While different companies seem to be subjected to different kinds of pressures, responding to that pressure can be a matter of survival for the companies in question. For example, a company experiencing problems with local communities would have to take steps in order to improve its environmental performance as well as towards communicating these improvements to the local community. That would allow the company to obtain what is called as a 'social licence to operate' or in other words, the approval of its conduct by the local community.

Similarly, companies increasingly require their supply chain customers to regulate and monitor their own environmental conduct. Kloefer (1997) and Voien (1998) claim that there are indications that EMSS implementation may become a way for suppliers to diffuse the pressure from their customers. Non Government Organisations NGOs increasingly demand better environmental performance. Under mounting pressure to modify their practices, some companies may use a voluntary tool, through which they will show their commitment to continuing environmental improvement. Similarly, legislation is getting tougher and this trend seems likely to

continue and therefore implementing EMSS may be used by proactive companies with a long-term vision who want to ensure that they are prepared for the future.

To summarize, the second hypothesis (H2) to be tested is that companies implementing the standards are under more pressure from a number of stakeholders/issues to improve their environmental performance compared with those companies currently not undergoing this process.

Opportunities

Porter and van der Linde (1995) suggest that companies' activities with regard to environmental issues may result in the introduction of innovative approaches which could help in the reduction of energy and raw material usage and in waste minimisation, thus achieving both environmental and business benefits. On the other hand, Wally and Whitehead (1994) claim that these so called win-win strategies could only be the exception rather than the rule. Whether many or few though, there are indications that the 'plan, do, check, rethink' approach of EMSS as well as involvement of all personnel from the top down is ideal for the sparking of innovative win-win strategies⁴. Thus, companies foreseeing opportunities for their company in this area may be more prone to implement the EMSS.

Amongst the most important opportunities arising from companies' activities with regard to environmental issues is the creation of a green profile; such a profile could appeal to both internal and external stakeholders. The former refers to employees whereas the latter includes customers, local communities, shareholders, regulatory bodies, financial institutions and insurers. Public surveys demonstrate a better corporate image for ethical businesses (Grimshaw *et al*, 1998) and increasing

demand for green products (ENDS 1998). However it is not clear whether these opportunities would make companies keener to implement EMSS.

Legal compliance is at the top of managers' agendas. In a survey on 'Green Business Clubs' legal compliance issues were the most significant among those issues for which companies sought practical help (Business in the Environment, 1998). It is also a milestone requirement of ISO14001 and EMAS systems, which guarantee the level of environmental improvement required by legislation. In fact, EMSS are designed to help companies to proceed beyond compliance with appropriate laws. To this extent, they reduce the possibility of non-compliance as well as the risk of liabilities (Diamond, 1997).

This discussion leads to the third hypothesis (H3) which will test whether companies deciding to implement the standards experience more important opportunities due to their activities with respect to the environment compared to companies that have not decided to implement the standards.

Local environmental conditions

It was previously mentioned that a company can be subjected to pressure from local communities with regard to its environmental performance. Thus, when a company operates close to an urban zone and is considered as a polluter, there is a possibility that local communities will react negatively to its operation. That could be especially true if there are indications or evidence that the company is breaching environmental regulations. However, even in those cases that there is no breach of environmental regulation a company would have to earn the trust of the local community that it is environmentally responsible.

⁴ Thorsen (1997) demonstrates a case study on how EMSS promoted employee participation, which

Similarly, when a company operates close to an area of sensitive environmental conditions, it may be subjected to special regulatory requirements and restrictions with regard to its operations. Indeed, there is specific Greek and EU regulation⁵ governing the provisions for a company applying for permission to operate or to expand. This regulation may also ban specific activities when the nature and impact of the operations would be incompatible with the surrounding environmental conditions. Additionally, and apart from the regulators, a company's operations may be under scrutiny by NGOs, the media and others.

In each of these cases where a company is operating in sensitive environmental conditions (whether an urban zone or an area of special natural beauty) it may decide to diffuse any pressure or the potential for conflict with regard to its operations. The company may achieve this by showing its commitment towards environmental issues through the implementation of a voluntary standard such as EMSS. This could help the company in question to further regulate its environmental impacts and communicate these improvements to relevant stakeholders.

The fourth hypothesis (H4) will test whether companies deciding to implement EMSS are more likely to operate in what they would consider as sensitive environmental conditions compared to companies that have not decided to implement EMSS.

resulted in process innovation with both environmental and economic benefits.

⁵ The EU regulation 85/337/EEC later modified to 97/11/EC provided the basis for the national regulation with respect to provisions for granting permission for the operation or expansion of industries and other big projects.

Empirical Application: The case of Greece

In order to test the above-mentioned hypotheses, two groups of companies were surveyed⁶. The first group of companies was quite straightforward to select. A joint project of the EU and the Greek Ministry of Development taking place at the time was the first attempt to promote EMSS implementation widely and all companies participating to this project were targeted. This group consisted of 101 companies and received a questionnaire during March 2000. By the end of June, 84 responses had been received.

The selection of the second group of companies was not so clear-cut and a number of different options were considered at the time. In order to conduct an accurate comparison it was thought very important to target companies that while not yet having decided to certify to an EMSS nevertheless were closely involved in environmental issues. Thus, the second group surveyed consisted of those companies that in the latest census of Greek industry (held by the Greek National Statistical Service) had conducted environmental expenditures (capital or current). This is not to claim that companies that had not conducted environmental expenditure could not implement the Standards in a way that could make both business and environmental sense. However, companies would normally conduct environmental expenditures either because it is required by law or because they are proactive⁷. By incorporating the criterion of environmental expenditures all Greek industry with a significant environmental impact, as defined by current environmental legislation, was targeted. The selection of these two groups allowed to compare the whole of the Greek industry that had decided to implement the standards with those that had not come to such a

⁶ The methodology used for the data analyses is based on similar comparative studies such as Lindell and Karagozoglu (2001) and Montabon *et. al.* (2000)

⁷ In the cases where companies were proactive it would be interesting to investigate and identify why these otherwise proactive companies have not as yet decided to implement EMSS.

decision. The second group consisted of 392 companies and more than 50% replied to this survey which was also conducted during the spring and summer of 2000.

While it is inevitable that non-response bias will exist, the high response rate ensures that it will be kept to a minimum. In order to avoid any bias associated with the design of the questionnaire, the questions for the hypotheses testing were worded and sequenced in exactly the same way in the two questionnaires used. Both groups surveyed cover the main industrial activities in Greece. Specifically, the group of companies surveyed that were perceived as implementing the standards were drawn mainly from the following industries: food and beverages 19%, production of metallic products 17%, production of chemicals 15%, production of non metal products 6%, textile industry 6%, production of furniture 3%, production of equipment 2% and others. Similarly, the group of companies surveyed that was not implementing the standards came from the following industrial sectors: food and beverages 34%, production of chemicals 11%, production of non-metal products 13%, textile industry 6%, production of furniture 3% and others.

Results and Discussion

The first set of questions of the survey aimed to identify the company's view on a number of key issues with respect to the environment. The respondent was asked to state the company's agreement or disagreement with a number of statements. The statements were chosen so as to provide indications of management perception of the environment. The results are outlined in the following table⁸:

⁸ Due to unknown population variances independent sample t-test was used to obtain the results of the following tables.

Table 1 Company's views with regard to environmental issues
(1= Strongly Disagree, 4= Strongly agree)

	Companies implementing EMSS		Companies NOT implementing EMSS		Significance Level
	Mean	SD	Mean	SD	
Environmental issues could significantly affect my company's image.	3.55	0.55	3.53	0.57	n.s.
Environmental considerations are of high importance in my company's decision making process.	3.30	0.62	3.31	0.61	n.s.
Companies should voluntarily proceed beyond mere compliance with environmental law.	3.46	0.57	3.22	0.71	**
Companies' activities for environmental protection are frequently associated with positive business benefits.	3.12	0.61	2.94	0.73	*
A company should be held responsible for any social and environmental problems that it may cause.	3.29	0.62	3.12	0.63	*

* $p < 0.05$, ** $p < 0.01$, n.s.= not significant.

No statistically significant differences were identified for the two first statements. Thus, there was not enough evidence to support the hypothesis that managers implementing the standards agree more strongly with the statement that environment issues could affect their company image. Similarly, there were no differences detected in the statement that environmental considerations are of high importance in their company's decision-making process.

However, there were statistically significant differences which supported the hypothesis that companies implementing the standards agreed more strongly with the statement that 'companies should voluntarily proceed beyond mere compliance with environmental law'. While it could be maintained that such a finding should not come as a surprise, and it should be self-evident since both ISO14001 and EMAS require companies to proceed beyond mere compliance with environmental law, we believe that this is an important finding. That is because companies could choose to implement the standards only in order to improve their image disregarding the part of

the standard requiring continual improvement beyond compliance with environmental law. There has been significant debate over the possibility of the standards to be abused since companies set their own objectives of continual improvement which could be significantly low (Klaver and Jonker, 1998; Burdick, 1997). These findings suggest that Greek companies implementing the standards believe that companies should proceed beyond mere legal compliance. (This belief is stronger compared to companies that are not implementing the standards.) While there is no measure as to how much beyond legal compliance the companies would proceed, since the statement was made irrespective of their involvement with the standards, we have no reason to believe that it is not genuine and significant.

Another statement where statistically significant differences between companies implementing and not implementing the standards were identified, was in the belief with regards to win-win strategies. Specifically, companies implementing the standards were found to more strongly believe that environmental protection activities are frequently associated with positive business benefits.

As far as the last statement is concerned, the answers of companies implementing the standards indicate that these managers believe more strongly in the environmental and social responsibilities of their company. This is in line with companies' answers with regard to whether companies should proceed beyond mere compliance with environmental law, although the last statement refers to social factors as well. To this end, there are indications that companies implementing the standards would probably be more sustainable in that they are more willing to undertake responsibility for the social as well as environmental consequences of their production activities.

The second set of questions intended to identify whether companies implementing EMSS are under more pressure to improve their environmental performance compared to companies that do not. It also intended to highlight the stakeholders or issues that exercise the greatest pressure: consumers, companies that buy intermediate products, the local community, legislation, Non-Governmental Organisations, employees and the general public. Different statements describing the pressure a company has sustained from stakeholders are given starting from 'A great deal of pressure' up to 'No pressure at all'.

Table 2 Pressure on company to improve its environmental performance
(0=no pressure at all, 4= a great deal of pressure)

	Companies implementing EMSS		Companies NOT implementing EMSS		Significance Level
	Mean	SD	Mean	SD	
Consumers	0.93	0.99	0.78	0.81	n.s.
Companies that you supply with commodities	1.09	1.04	1.02	1.01	n.s.
Local community	1.55	1.14	1.95	1.17	**
Legislation	1.95	1.03	2.38	1.13	**
Non-Governmental Organisations (e.g. Greenpeace)	0.73	1.00	0.90	1.06	n.s.
Your employees	1.05	0.97	1.17	1.06	n.s.
The general public	1.19	1.12	1.27	1.07	n.s.

**p<0.01, n.s.= not significant

The two areas where companies' answers differed significantly were legislation and local communities. Quite surprisingly though, in both these areas companies that were not in the process of EMSS implementation reported being under the highest pressure. This is a very interesting finding, contradicting the hypothesis that companies implementing the standards are likely to be under more pressure compared with companies that do not. The implications of this finding are more interesting when considering that companies that have decided to implement the standards have not yet fully done so. Had that been the case it could be claimed that

the standards had helped companies to deal with any pressure experienced and would explain why they experienced less pressure than other companies. However since this is not the case, one possible explanation is that there is a different mindset between companies which are implementing the standards and those which are not, in that the former do not perceive the requirements of law and of local communities as pressure. Such an explanation is also in line with the fact that companies implementing the standards agreed more strongly with the statement that they should voluntarily proceed beyond legal compliance. In fact they may have already done so or if not, they are probably planning to do so. If a company has proceeded beyond legal compliance or has such plans, the current standard of legal requirements is unlikely to be considered too high or as exerting too much pressure.

Similarly, since companies implementing the standards agreed more strongly with the statement that companies should be held responsible for any social and environmental problems that they may cause, they are more likely to have established better relations with local communities than other companies. Their higher level of responsibility seems to be associated with lower levels of pressure from local communities.

The third set of questions aimed to assess the importance of opportunities arising for companies as a result of their environmental activities. The questionnaire listed a range of possible opportunities for companies, which were to be ranked on a scale from 'essential' to 'not at all important'. The areas listed are as follows:

- energy efficiency,
- raw material efficiency,
- waste minimisation,
- increased management efficiency,
- increased legal compliance,
- lower insurance premiums,
- easier access to financial markets,
- better training of the employees,

- increased employee morale and motivation,
- better organisation of environmental issues,
- better company image,
- competitive advantage,
- meeting of customers' requirements/expectations,
- better relations with local communities and
- environmental protection

Table 3 Importance of opportunities arising for the company as a result of its activities with respect to environmental issues
(0= not at all important, 4= essential)

	Companies implementing EMSS		Companies NOT implementing EMSS		Significance Level
	Mean	SD	Mean	SD	
Energy Efficiency	2.27	1.21	2.29	1.24	n.s.
Raw material efficiency	2.39	1.25	2.30	1.19	n.s.
Waste minimisation	2.61	1.14	2.57	1.15	n.s.
Management efficiency	2.25	1.05	2.05	1.12	n.s.
Legal compliance	2.79	1.07	2.73	1.02	n.s.
Lower insurance premiums	1.46	1.32	1.37	1.22	n.s.
Easier access to financial markets	1.05	1.22	1.33	1.33	n.s.
Better employee training	2.30	1.07	2.02	1.07	*
Employee morale and motivation	2.33	0.99	2.05	1.09	*
Better organisation of environmental issues	2.86	0.84	2.41	0.97	***
Better company image	3.27	0.78	2.99	0.87	**
Competitive advantage	2.56	1.22	2.17	1.24	*
Requirements or expectations of your customers	2.10	1.19	1.97	1.21	n.s.
Better relations with local communities	2.67	1.02	2.69	1.07	n.s.
General environmental protection	3.20	0.89	2.96	0.92	*

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n.s. = not significant

Significant differences were identified for the areas of better employee training, better organisation of environmental issues, better company image, competitive advantage and general environmental protection. Specifically, companies that implement the standards report experiencing more important opportunities in these areas compared with companies that do not. Quite interestingly, companies

considered the impact of their environmental activities on their image, their competitive advantage and the general environmental performance to be amongst the most significant opportunities presented.

As was previously discussed, companies not implementing the standards were found to be under more pressure to improve their environmental performance from legislation and local communities compared to companies implementing the standards. However, no significant differences were found with regard to companies' answers in these areas (legal compliance and relations with local communities) about the opportunities likely to be experienced as a result of their activities with regards to the environment. This indicates the existence of a different mindset between companies which implement the standards and take voluntarily action with regard to environmental issues compared to non implementing companies which do not take voluntary action. The latter seem to be subjected to greater pressure by legislation and local communities without being able to recognise any opportunities for their company in these areas. In a sense, the calls of legislation and local communities for better performance are depicted as a potential cost or something to be resisted rather than as a potential benefit or opportunity.

The fourth set of questions asked companies to indicate the sensitivity of the environmental conditions within which their company operates in a range of answers between 'very sensitive' to 'not sensitive at all'. Of those companies implementing EMSS, 40% answered 'sensitive' and another 14% answered 'very sensitive'. When these companies were asked how important the local environmental conditions were in their decision to implement the standards, 44% answered that they considered it as an important reason and another 8% as a very important reason. The rest of the

companies replied that it was not very important (36%) and not important at all (12%).

Companies that were not implementing the standards gave similar pattern of answers with regards to the sensitivity of the environmental conditions in the area within which they operate. Specifically 36% answered that they were operating in 'sensitive' environmental conditions and another 22% in very sensitive environmental conditions. Overall, there were not enough evidence to support the hypothesis that companies operating in what they would consider as sensitive environmental conditions would be more likely to implement EMSS. However, since more than 50% of the companies implementing EMSS considered it to be an important or very important factor, this indicates that it is a significant factor although not critical in companies' decisions. Thus, a possible explanation could be that the companies would not implement the standards only on the basis of their assessment of the local environmental conditions but this factor may be more significant when it is considered in combination with other significant factors previously discussed.

Conclusions

This paper tests four hypotheses with regard to the significance of a number of factors in a company's decision to implement EMSS. Specific aspects of the hypotheses posed were supported and confirmed a range of factors that are important in a company's decision to implement EMSS. Specifically, managers implementing the standards, compared with those that were not, believed more firmly that companies should proceed beyond mere compliance with environmental law, that business benefits are frequently associated with environmental ones and that companies should be held responsible for any social and environmental problems that they may cause. Furthermore, companies deciding to implement the standards would

normally claim to be under less pressure from law and local communities. Lastly, these companies would recognise more opportunities, (such as for a greener image and a competitive advantage) arising from their activities with regard to environmental issues.

Overall, there are strong indications that companies implementing the standards have a different mindset with regard to environmental issues. In other words, they are more likely to treat environmental issues as opportunities rather than as threats to their business. Similarly, they recognise the environmental responsibilities for their companies while being willing to deal with them in a strategic and proactive way. On the other hand, companies that have not decided as yet to implement EMSS perceive their environmental responsibilities as pressure and a potential threat to their business while their response is reactive and only short-term.

The implications of these findings are important since policy makers will be provided with better insights into those factors critical in a company's decision to implement EMSS. Should they decide to promote the standards they could include these factors within their decision making process.

These results are representative of Greek industry and would be of particular interest to identify whether similar findings may be applicable in different EU countries as well. That could result from the fact that the regulatory framework, as well as the market conditions, are increasingly becoming level within the EU. However further research would be required to confirm these claims and these findings could form the baseline in designing such research.

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References

Arora S, Cason T. 1996 Why Do Firms Volunteer to Exceed Environmental Regulation? Understanding Participation in EPA's 33/50 Program, *Land Economics*, **4**: 413-432

Burdick D, 1997 Industry Cases and Practices: A Recent Survey of Benchmarking Corporate Perceptions of ISO14000 Benefits. In *Moving Ahead with ISO14000* Marcus P, Willig J (eds). Wiley

Business in the Environment 1998 Green Clubs surveyed. *Business in the Environment* Issue **12**, Summer

Diamond C. 1997 Industry Cases and Practices: Voluntary Environmental Management System Standards. In *Moving Ahead with ISO14000* Marcus P, Willig J (eds). Wiley

Diller M J. 1997 ISO 14001 Certified: To Be or Not to Be..., *Chemical Engineering Progress*, **11**: 36-9

ENDS. 1998 Market advantages for ethical businesses. *ENDS* report 276

Evangelinos IK, Blaza A. 1999 Environmental Management Systems Standards-Achieving Greater Credibility Through Greater Visibility of their Outputs. Conference Proceedings. *6th International Conference of Environmental Science and Technology*, Samos, Greece.

European Foundation 2001 *Design for Sustainable Development: The success factors*, European Foundation for the Improvement of Living Conditions, Luxembourg

Getimis P, Giannakourou G. 2001 The Development of Environmental Policy in Greece, In eds. Heinelt, H Malek, T Smith, R and Toller, A E *European Union Environment Policy and New Forms of Governance*, Ashgate Publishing, Aldershot

Goodchild E. 1998 The Business Benefits of EMS Approaches Conference Proceedings. *The Eco-Management and Auditing Conference*, July 2nd and 3rd University of Sheffield, UK

Grimshaw C, Howard M, Willmott M. 1998 The Responsible Organisation. The roles and responsibilities of the Big Citizens of the 21st Century. *The future foundation*. A report commissioned by BT

Klaver J, Jonker J. 1998 The significance of recent EMS standards as an impetus for improvement. *Eco-Management and Auditing* **5**: 1-5

Kloepfer R. 1997 Will the Real ISO 14001 please stand up. *Civil Engineering*. **67**, 11: 45-47

Lindell M, Karagozoglu N, 2001 Corporate Environmental Behaviour - A comparison between Nordic and US Firms. *Business Strategy and the Environment* **10**: 38-52

Montabon F, Melnyk S, Sroufe R, Calantone R. 2000 ISO14000: Assessing Its Perceived Impact on Corporate Performance. *The Journal of Supply Chain Management*. Spring 2000

Porter M, van der Linde C. 1995 Green and Competitive: Ending the Salemate. *Harvard business review*. Sept- Oct: 120-134

Rivera-Camino J. 2001 What motivates European Firms to Adopt Environmental Management Systems? *Eco-Management and Auditing* **8**: 134-143

Sayre, D 1996 Inside ISO 14000: The Competitive Advantage of Environmental Management, St Lucie Press

Schaltegger S, Burrit R. 2000 Contemporary Environmental Accounting: Issues, Concepts and Practice, Greenleaf Publishing

Schaltegger S, Kaspar M, Hindrichsen H. 1996 Corporate Environmental Accounting, Wiley

Steger U. 2000 Environmental Management Systems: Empirical Evidence and Further Perspectives. *European Management Journal*:**18**, 1: 23-37

Thorsen N. 1997 Cleaner production through environmental management of process innovations. In *Environmental Management Systems and Cleaner Production*. Hillary R. (ed) Wiley

Voien S, 1998 Environmental Management with ISO14000. *EPRI Journal* March - April

Wally N, Whitehead B. 1994 It's not easy being green. *Harvard Business Review*, May – June: 46-52